

CLAIMS:

1. A system that performs a test on a test sample determining a coagulation test time comprising:

a test cartridge comprising:

a cartridge housing having at least one cylindrical test chamber therein into which a test sample is deposited to be tested, the test chamber having a test chamber axis, a test chamber diameter and a test chamber height defining a test chamber volume; and

an agitator mounted at a pivot point at the test chamber axis, the agitator having an agitator vane adapted to be swept about the pivot point and through the test sample in the test chamber, the agitator vane having an agitator vane height extending substantially through the test chamber height and an agitator vane length extending substantially through the test chamber diameter; and

a test instrument having an instrument housing including a cartridge receptacle for supporting the test cartridge, the test instrument further comprising

sweeping means for sweeping the agitator vane about the test chamber pivot point through the test sample in substantially the full test chamber volume; detecting means for detecting a reduction of sweeping movement of the agitator vane; and

timing means for timing a coagulation test time elapsed from the commencement of sweeping of the agitator vane until the detection of reduction of the sweeping movement.

2. The system of Claim 1, wherein:
the test cartridge is formed of a cartridge housing enclosing each test chamber into which a test sample is to be introduced and comprising a test chamber pivot element; and
the agitator vane comprises an agitator pivot element engaging the test chamber pivot element allowing rotational motion of the agitator vane about a pivot axis at the pivot point.
3. The system of Claim 2, wherein the agitator vane comprises first and second agitator vane leaflets extending in opposed directions away from the pivot axis through the agitator vane length presenting agitator leaflet sweeping faces bounded by vane leaflet edges against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.
4. The system of Claim 3, wherein the agitator vane leaflets are symmetric and shaped in the form of propeller blades and present symmetric, curved propeller sweeping faces against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.
5. The system of Claim 3, wherein the agitator vane is tubular and the agitator vane leaflets are symmetric and present symmetric convex curved leaflet sweeping faces against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.
6. The system of Claim 3, wherein the agitator vane leaflets are symmetric and present symmetric substantially flat leaflet sweeping faces against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.

7. The system of Claim 6, wherein the agitator vane comprises an elongated U-shaped channel extending between opposed channel ends and an agitator pivot element between the opposed channel ends.
8. The system of Claim 6, wherein the vane leaflet edges are notched.
9. The system of Claim 3, wherein the agitator vane comprises an elongated U-shaped channel extending between opposed channel ends and an agitator pivot element between the opposed channel ends.
10. The system of Claim 3, wherein the vane leaflet edges are notched.
11. The system of Claim 3, wherein the agitator vane leaflets are symmetric and present symmetric substantially convex leaflet sweeping faces against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.
12. The system of Claim 11, wherein the agitator vane comprises an elongated tube extending between opposed tube ends and an agitator pivot element between the opposed tube ends.
13. The system of Claim 3, wherein the agitator vane leaflets are symmetric and present symmetric concave curved leaflet sweeping faces against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.
14. The system of Claim 3, wherein the agitator vane leaflets are symmetric and present symmetric leaflet sweeping faces having notched leaflet edges against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.

15. The system of Claim 3, wherein the agitator vane leaflets are formed by a substantially rectangular frame surrounding a leaflet window, whereby the agitator vane leaflets present leaflet sweeping faces having at least one window against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.

16. The system of Claim 15, wherein the frame supports a mesh disposed across the leaflet window.

17. The system of Claim 3, wherein the agitator vane leaflets have a plurality of sieve holes extending through the agitator vane leaflets, whereby the agitator vane leaflets present leaflet sweeping faces having a plurality of sieve holes against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.

18. The system of Claim 3, wherein the agitator vane leaflets have a plurality of slots extending through the agitator vane leaflets, whereby the agitator vane leaflets present leaflet sweeping faces having a plurality of substantially parallel teeth against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.

19. The system of Claim 18, wherein the plurality of substantially parallel teeth of each vane leaflet extend away from the pivot axis.

20. The system of Claim 3, wherein a mesh is disposed across the agitator leaflet sweeping faces.

21. A test cartridge for use in a system that performs a test on a test sample determining a coagulation test time comprising:

a cartridge housing having at least one cylindrical test chamber therein into which a test sample is deposited to be tested, the test chamber having a test chamber axis, a test chamber diameter and a test chamber height defining a test chamber volume; and

an agitator mounted at a pivot point at the test chamber axis, the agitator having an agitator vane adapted to be swept about the pivot point and through the test sample in the test chamber, the agitator vane having an agitator vane height extending substantially through the test chamber height and an agitator vane length extending substantially through the test chamber diameter,

whereby the agitator is adapted to be swept through substantially the test chamber volume and contacts the test sample therein and a coagulation test time from the commencement of sweeping of the agitator vane until the detection of reduction of the sweeping movement is determinable.

22. The test cartridge of Claim 21, wherein:

the test cartridge is formed of a cartridge housing enclosing each test chamber into which a test sample is to be introduced and providing a test chamber pivot element; and

the agitator vane comprises an agitator pivot element engaging the test chamber pivot element allowing rotational motion of the agitator vane about a pivot axis at the pivot point.

23. The test cartridge of Claim 22, wherein the agitator vane comprises first and second agitator vane leaflets extending in opposed directions away from the pivot axis through the agitator vane length presenting agitator leaflet sweeping faces bounded by vane leaflet edges against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.

24. The test cartridge of Claim 23, wherein the agitator vane leaflets are symmetric and shaped in the form of propeller blades and present symmetric curved propeller sweeping faces against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.

25. The test cartridge of Claim 23, wherein the agitator vane is tubular and the agitator vane leaflets are symmetric and present symmetric convex curved leaflet sweeping faces against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.

26. The test cartridge of Claim 23, wherein the agitator vane leaflets are symmetric and present symmetric substantially flat leaflet sweeping faces against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.

27. The test cartridge of Claim 26, wherein the agitator vane comprises an elongated U-shaped channel extending between opposed channel ends and an agitator pivot element between the opposed channel ends.

28. The test cartridge of Claim 26, wherein the vane leaflet edges are notched.

29. The test cartridge of Claim 23, wherein the agitator vane comprises an elongated U-shaped channel extending between opposed channel ends and an agitator pivot element between the opposed channel ends.

30. The test cartridge of Claim 23, wherein the vane leaflet edges are notched.

31. The test cartridge of Claim 23, wherein the agitator vane leaflets are symmetric and present symmetric substantially convex leaflet sweeping faces against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.

32. The test cartridge of Claim 31, wherein the agitator vane comprises an elongated tube extending between opposed tube ends and an agitator pivot element between the opposed tube ends.

33. The test cartridge of Claim 23, wherein the agitator vane leaflets are symmetric and present symmetric concave curved leaflet sweeping faces against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.

34. The test cartridge of Claim 23, wherein the agitator vane leaflets are symmetric and present symmetric leaflet sweeping faces having notched leaflet edges against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.

35. The test cartridge of Claim 23, wherein the agitator vane leaflets are formed by a substantially prismatic frame surrounding a leaflet window, whereby the agitator vane leaflets present leaflet sweeping faces having at least one window against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.

36. The test cartridge of Claim 35, wherein the frame supports a mesh disposed across the leaflet window.

37. The test cartridge of Claim 23, wherein the agitator vane leaflets have a plurality of sieve holes extending through the agitator vane leaflets, whereby the agitator vane leaflets present leaflet sweeping faces having a plurality of sieve holes against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.

38. The test cartridge of Claim 23, wherein the agitator vane leaflets have a plurality of slots extending through the agitator vane leaflets, whereby the agitator vane leaflets present leaflet sweeping faces having a plurality of substantially parallel teeth against the test sample disposed in the test chamber during rotation of the agitator vane leaflets.

39. The test cartridge of Claim 38, wherein the plurality of substantially parallel teeth of each vane leaflet extend away from the pivot axis.

40. The test cartridge of Claim 23, wherein a mesh is disposed across the agitator leaflet sweeping faces.

41. A method of performing a test on a test sample and determining a coagulation test time comprising:

providing a test cartridge comprising:

a cartridge housing having at least one cylindrical test chamber therein into which a test sample is deposited to be tested, the test chamber having a test chamber axis, a test chamber diameter and test chamber height defining a test chamber volume; and

an agitator mounted at a pivot point at the test chamber axis, the agitator having an agitator vane adapted to be swept about the pivot point and through the test sample in the test chamber unless impeded by coagulation of the test sample, the agitator vane having an agitator vane

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height extending substantially through the test chamber height and an agitator vane length extending substantially through the test chamber diameter; and
filling the test chamber with a test sample;
inserting the test cartridge into a cartridge receptacle of a test instrument;
and
operating the test instrument to:
sweep the agitator vane about the test chamber pivot point through the test sample;
detect the reduction of sweeping movement of the agitator vane; and
time a coagulation test time elapsed from the commencement of sweeping of the agitator vane until the detection of reduction of the sweeping movement.

42. A method of performing a test on a biologic test sample and determining a coagulation test time comprising:

providing a test cartridge comprising:
a cartridge housing having at least one cylindrical test chamber therein into which a test sample is deposited to be tested, the test chamber having a test chamber axis, a test chamber diameter and test chamber height defining a test chamber volume; and
an agitator mounted at a pivot point at the test chamber axis, the agitator having an agitator vane adapted to be swept about the pivot point and through the test sample in the test chamber unless impeded by coagulation of the test sample, the agitator vane having an agitator vane height extending substantially through the test chamber height and an agitator vane length extending substantially through the test chamber diameter; and
filling the test chamber with a test sample;
inserting the test cartridge into a cartridge receptacle of a test instrument;
and
operating the test instrument to:

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sweep the agitator vane about the test chamber pivot point through the test sample;

detect the sweeping movement of the agitator vane; and

display an image of the sweeping movement of the agitator vane, whereby changes in the sweeping movement due to coagulation and dissolution of coagulation are presented.

43. The method of Claim 42, wherein the test sample is a blood test sample and the dissolution of coagulation is due to fibrinolysis of coagulation.